

### REMARKS

Claims 1-79 are pending in the case, of which claims 1-22, 32-50, 56-65, 69, 70, 73, 74, 77 and 78 are withdrawn from consideration. In the office action, claims 23-28, 51-55, 66 and 67 are allowed, claims 29-31, 68, 72 and 76 are rejected and claims 71, 75 and 79 are objected to as being dependent upon a rejected base claim but are allowable if rewritten in independent form. In the present submission, claims 29-31, 68, 70, 72 and 74-76 have been amended. The specification has been amended to correct a typographical error. Reconsideration is respectfully requested.

#### **Claim Objection**

Claim 76 is objected to due to an informality. In the present amendment, claim 76 has been amended as suggested by the Examiner. Withdrawal of the claim objection is respectfully requested.

#### **§112 Rejection**

Claims 29-31 are rejected under 35 U.S.C. §112, first paragraph, because claims 29-31 are dependent claims drawn to an independent claim that has not been elected for examination. Claims 29-31 are dependent upon non-elected claims due to typographic errors. In the present submission, claims 29-31 have been amended to correct their claim dependency. Specifically, claims 29 and 30 have been amended to depend from claim 23 and claim 31 has been amended to depend from claim 30. Claims 29-31, as thus amended, now depend from allowed claim 23. Claims 29-31 are therefore in condition for allowance for at least the same reasons claim 23 is allowable. Withdrawal of the §112 rejection of the claims is respectfully requested.

#### **§102 Rejection**

Claims 68, 72, 76 are rejected under 35 U.S.C. §102(e) as being anticipated by Kimura (US 6,496,525). The Examiner contends that Figure 7 of Kimura discloses every limitation of the rejected claims. Applicant respectfully traverses the rejection.

## Kimura

Kimura is directed to a “laser driver....adapted to keep the optical output power of a laser diode constant even if the temperature has changed or if the performance of the laser diode has deteriorated with time.” (See Abstract of Kimura.) Kimura concerns a laser driver where high-precision and stabilized *automatic power control (APC)* performance is realized. (See, col. 1, lines 61-64, col. 2, lines 17-24, of Kimura.) Kimura’s laser driver is designed to improve the APC, *not to turn on the laser diode*, after the laser diode has been turned off.

Turning to Figure 7 where the second embodiment of the laser driver of Kimura is shown, Kimura states that:

...an adaptive bias circuit 8 is further provided as shown in FIG. 7 **to speed up the APC response** by rapidly charging or discharging the holding capacitor 5 if a difference between the monitor voltage  $V_{vc}$  output from the current-to-voltage converter 2 and the reference voltage  $V_{ref}$  generated by the reference voltage generator 3 is larger than a predetermined value. (Kimura, col. 9, lines 38-44; emphasis added.)

Figures 8(a) and 8(b) illustrate the operation of the laser driver of Figure 7. When the difference between the monitor voltage  $V_{vc}$  and the reference voltage  $V_{ref}$  is larger than  $\Delta V$ , the adaptive bias circuit 8 supplies a large current to rapidly charge the holding capacitor 5. Meanwhile, when the difference between the monitor voltage  $V_{vc}$  and the reference voltage  $V_{ref}$  is smaller than  $\Delta V$ , the adaptive bias circuit 8 is deactivated. (See Kimura, col. 9, lines 47-67.) Furthermore, “the adaptive bias circuit 8 is activated responsive to **a control signal ABC supplied** from the control signal generator 7A **after the prescribed time  $T_d$**  has passed since the drive current output circuit 6 was made to start to output the laser drive current  $I_{LD}$ ” (Kimura, col. 10, lines 1-5, emphasis added.)

As shown in Figure 8(a), the ABC signal from control signal generator 7A is activated a delay time  $T_d$  after the assertion of the data signal DATA. By the time the ABC signal is activated, the monitor voltage  $V_{vc}$  indicates that the laser diode has already been driven to its maximum equilibrium value. Therefore, *any “boost” current provided by the adaptive bias circuit 8 will not contribute to the “turning on” of the laser diode as the laser diode has already been turned on by the time the boost current is provided.* Rather, as explained by Kimura, the extra current provided by adaptive bias circuit 8 only operates to speed up the APC. It is imperative to note that the control signal ABC is generated a time delay after the

data signal DATA and is therefore modulated corresponding to the data signal DATA. The control signal ABC is *not* a signal for turning on the laser diode.

#### Claim 68

Claim 68, as originally filed, is patentable over the cited reference at least by reciting “a laser turn-on control circuit coupled to receive **a first signal for turning on the laser diode.**” Nonetheless, Applicant amends claim 68 to further clarify the claim. Specifically, claim 68 has been amended to recite “a laser turn-on control circuit coupled to receive **a first signal for turning on the laser diode when the laser diode has been turned off.**” The amendment in claim 68 clarifies that the laser turn-on control circuit is operative to accelerate the *turn-on* of a laser diode, *not* to speed up the automatic power control function of the laser diode as is described by Kimura.

The laser turn-on control circuit of claim 68 operates to turn on the laser diode, *after the laser diode having been turned off*. The problem solved by the claimed invention of claim 68 is described in paragraphs [0004] to [0005] of Applicant’s specification where Applicant explained that a laser diode requires a bias current above a threshold level so that lasing can occur and that this bias current must be provided to “turn on” the laser diode. The laser diode is turned off when the bias current applied to the laser diode has dropped below the threshold level. The turn-on and turn-off conditions of a laser diode are further explained in paragraphs [0032] and [0034] of Applicant’s specification. For instance, the “start laser signal” is provided “to turn the laser diode on when the laser diode has been turned off.” *Id.* The start laser signal can also be a power-on-reset signal. *Id.*

The laser turn-on control circuit of the claimed invention of claim 68 is directed to accelerating the turn-on of a laser diode. This feature of claim 68 is not taught or suggested by the cited reference. Kimura describes a circuit for speeding up the APC performance. Kimura does not teach or suggest accelerating the turn-on operation of the laser diode.

In fact, the adaptive bias circuit 8 of Kimura does not receive any signal for turning on the laser diode. The control signal ABC is generated by control signal generator 7A responsive to the data signal DATA. The data signal DATA is not a signal for turning on the laser diode. Even if we assume *arguendo* that the control signal ABC is for turning on the laser diode, the control signal ABC is purposely delayed from the time the drive current output circuit 6 was made to start to output the laser drive current ILD. Therefore, any current provided by the adaptive bias circuit 8 cannot contribute to the “turning on” of the laser diode.

As shown in Figure 8(a), by the time the control signal ABC is activated, the laser diode has already been turned on as the monitor voltage  $V_{ivc}$  has already increased to its maximum equilibrium value. The extra current provided by adaptive bias circuit 8 only operates to speed up the APC performance and has nothing to do with accelerating the turn-on of the laser diode.

For the reasons stated above, claim 68, as originally filed and as currently amended, is patentable over the cited reference at least by reciting “a laser turn-on control circuit coupled to receive a first signal for turning on the laser diode when the laser diode has been turned off.” Claim 68 is in condition for allowance.

#### Claim 72

Claim 72, as originally filed, is patentable over the cited reference at least by reciting “a laser turn-on control circuit coupled to receive **a first signal for turning on the laser diode.**” Nonetheless, Applicant amends claim 72 to further clarify the claim. Specifically, claim 72 has been amended to recite “a laser turn-on control circuit coupled to receive **a first signal for turning on the laser diode when the laser diode has been turned off.**” For the same reasons stated above with reference to claim 68, claim 72 is patentable over the cited reference. Claim 72 is in condition for allowance.

#### Claim 76

Claim 76, as originally filed, is patentable over the cited reference at least by reciting “receiving a first signal having a first state for turning on the laser diode and a second state for turning off the laser diode.” Nonetheless, Applicant amends claim 76 to further clarify the claim. Specifically, claim 76 has been amended to recite “receiving a first signal having a first state for turning on the laser diode **when the laser diode has been turned off** and a second state for turning off the laser diode” For the same reasons stated above with reference to claim 68, claim 76 is patentable over the cited reference. Claim 76 is in condition for allowance.

#### Claims 71, 75 and 79

Claims 71, 75 and 79 are objected to as being dependent upon a rejected base claim but are allowable if rewritten in independent form. For the reasons stated above, the base

claims 68, 72 and 76, from which respective claims 71, 75 and 79 depend, are in condition for allowance. Claims 71, 75 and 79 therefore are also in condition for allowance.

In the present submission, claim 75 has been amended to correct the antecedent basis for a claim term.

#### Withdrawn Claims

Claims 1-22, 32-50, 56-65, 69, 70, 73, 74, 77 and 78 have been withdrawn from consideration due to a restriction requirement as being directed to separate species of the claimed invention. However, for the reasons stated above, generic claims 68, 72 and 76 are in condition for allowance. Applicant respectfully requests rejoinder and consideration of withdrawn claims 1-22, 32-50, 56-65, 69, 70, 73, 74, 77 and 78. Claims 1-22, 32-50, 56-65, 69, 70, 73, 74, 77 and 78 are patentable over the cited reference at least for the same reasons as the allowed claims 23-28, 51-55 and 66-67 and generic claims 68, 72 and 76.

In the present submission, claims 70 and 74 have been amended to conform the claims to their respective independent claims 68 and 72.

#### CONCLUSION

Claims 1-79 are pending in the present application. In the present submission, claims 29-31, 68, 70, 72 and 74-76 have been amended. Rejoinder of the withdrawn claims 1-22, 32-50, 56-65, 69, 70, 73, 74, 77 and 78 is respectfully requested. For the reasons stated above, claims 1-79 are in condition for allowance and passage of the present application to allowance is respectfully requested. If the Examiner would like to discuss any aspect of this application, the Examiner is invited to contact the undersigned at (408) 382-0480.

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